

ABSTRACT

Nuclear magnetic resonance well logging apparatus and method of use for geophysical examination of a borehole as the borehole is drilled. The apparatus is connected to the drill bit to follow it through the borehole as the borehole is formed. The apparatus comprises a non-magnetic protective collar with lateral protrusions or wings, which provide enhanced abrasion resistance, strength, and rigidity to the probe section. This collar is twisted about its longitudinal axis. The apparatus also comprises one or more permanent magnets within the metal collar and an antenna mounted outside of the collar. Both the magnet and the antenna are twisted about the longitudinal axis of the probe section to produce a generally helical static magnetic field and a radio frequency magnetic field that is substantially orthogonal to the static magnetic field.